POPULAR
Computing
WEEKLY

July 1981 Vol 1 No 12

35p

1K ZX Chess

Vic Breakout

Data transfer

Vic characters

Spectrum Graphics

Win a ZX Spectrum & ZX Printer - details inside





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How to submit articles
Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programs should, whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article, so please keep a copy.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Cover illustration by Stuart Hughes

Editorial

When Clive Sinclair first launched his ZX Spectrum in April, it was widely acclaimed as a breakthrough in low cost engineering.

However, the ZX Microdrive, announced at the same time as the Spectrum, excited as much if not more interest among the microcomputing fraternity. The Microdrive, said Sinclair, could hold up to 100K bytes on a single interchangeable microfloppy, with a transfer rate of 16K bytes a second.

The Microdrive is due to be released later this year, probably in October, and will cost about £50. As with the ZX Printer, it should be possible to connect the Microdrive to other microcomputers apart from the Spectrum.

But little has been heard of the Microdrive since it was first announced. Indeed there has been some speculation that the Microdrive is not a disc system at all, but some form of tape storage method.

Either way, I suspect that when the Microdrive appears, it will prove to have some surprises in store.

Next Week





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ZX81 16K, boxed, M/C [illegible] [illegible] Tel 01-[illegible]

ZX81 16K, [illegible] £120 [illegible] (Answerphone)

Texas and Atari in micro price war

THE expected micro price war has begun.

Both Texas Instruments and Atari have significantly reduced the price of their home computers.

Texas Instruments have cut the price of their 16-bit TI 99/4A machine from £315 to £199.

Irfan Salim, TI's Marketing Manager, identifies three reasons for this dramatic price drop. A quickly developing UK market and resulting sales has allowed TI to drop their price. It has also meant that retailers can manage with a diminished profit margin. Lastly, the increasingly competitive market in Britain has been a major determining factor.

Atari, meanwhile, have cut the price of the Atari 400 from £299.95 to £199.99. This price does not include the Basic programmer kit, now at £49.99, or the entertainment kit, now at £69.99.



The competing micros

IBM used FBI to knock out competition

HITACHI and Mitsubishi have both denied that they acted illegally in procuring information about IBM's latest computer (see *PCW July 1*).

It has been suggested that IBM may have involved the FBI to knock out the rival companies. IBM gave an undercover FBI agent confidential technical documents which were then used to trap the 18 accused Hitachi and Mitsubishi employees.

The case has now assumed an even greater importance. On June 30 the US Federal Grand Jury added the Hitachi company itself to the list of those accused.

Hitachi has reacted strongly to the move, denying that either it or its employees have engaged in illegal activities.

Hitachi may claim in its defence that its employees were entrapped by the FBI and IBM. If this were proven to be the case, its employees could not be convicted.

Out for the count in China

TWENTY-NINE specially imported IBM computers will be used to sort data from China's national census which began on June 30.

More than 5m enumerators will be employed in this, the largest data collection exercise in history.

The IBM machines will take over four years to process the data on China's estimated 1000.22m population.

Binatone prepare £50 Woolworth's computer

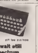
BINATONE intend to produce their new 16K colour micro, which will retail at £49.95, in time for Christmas.

Gulu Lalvani, chairman of Binatone, points out that although the company may not be noted for its technical innovations, it has considerable experience of consumer electronics and retail pricing and marketing.

Now convinced that the home micro market is here to stay, Binatone are confident that they can produce the product. The machine will be manufactured and quality-checked in the Far East. In the UK it will be sold at a manufacturer's mark up considerably less than that of the Sinclair ZX81.

Binatone will rely on high volume sales to ensure that the venture will be successful.

Next year Binatone plan to manufacture more than 300 000 of the micros. They will be sold with a 12 month guarantee through the company's usual outlets, including Woolworth and Rumbelow.



Spectrum still few available

Long wait still for Spectrum

FOLLOWING the discovery of a design fault (*PCW* June 17) Sinclair is still only sending out a limited number of hand-modified Spectrums.

Full production capacity cannot be restored until new printed circuit boards are manufactured. These are due in mid-August.

It seems likely that buyers will have to wait until at least the end of August before the hoped for 28-day delivery is achieved.

A credit to us all

AMERICAN Express in the US received over 25 000 orders for the ZX81 home computer in the first three weeks of June.

This follows the decision to sell the Sinclair machine to American Express credit cardholders through a direct mail offer.

By noon the day after the mailing 2000 orders had already been received and American Express is predicting that final sales will top 50 000.

Computer control

AB Electronic Products Group, manufacturers of the BBC Acorn, are working with British Leyland to produce a micro-based control system for Jaguar Cars.

Hard talk over alleged software pirating

TWO small software suppliers have clashed following the alleged piracy of games tapes.

Audiogenic is considering taking legal proceedings against Arfon Microelectronics following an alleged copyright infringement of the games *Amok* and *Alien Blitz*.

Martin Maynard, Audiogenic's Managing Director, saw the offending software being displayed on the Arfon stand at the Commodore show in London last month. Audiogenic has exclusive distribution rights for those games.

While Arfon insist that the games were not being offered for sale, Maynard has issued an open letter to all Commodore dealers warning of the possible breach of copyright.

Audiogenic have instructed Arfon to stop manufacture and sales of *Amok* and *Alien Blitz*, to account for any money received from such sales, and to place trade advertisements giving notification that Arfon has no rights to the products.

"We are trying to protect our market and our authors," Martin Maynard told *PCW*. "We need a printed retraction to reassure them. Legal proceedings will take place only if Arfon does not comply."

Magazine plays the name-game

THE not-so-new newest magazine has been forced to change its name, apparently because of possible confusion between it and other publications.

July has seen British promotion for the new magazine from Argus Specialist Publications.

Unfortunately, the publication has appeared with several titles. On the cover it is *Personal Computing Today* but inside it is variously *Personal Computing* and *Personal Computing Monthly*.

Editor Ron Harris explained that the magazine had originally been called *Personal Computing*. "But the name has been changed to avoid confusion with an existing publication," he said.

Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Please teach us how to use machine code!

YOUR editorial in the June 17 issue was very rousing though I suspect from many ZX81 users very much misguided.

I do not have a programming background though I did purchase a ZX81 complete with 16K Ram as I was keen and interested to learn. Already from buying several tapes containing machine coded programs I am aware of the vastly superior performance of machine code.

However it is not because I lack courage that I am still stuck with Basic. It is because there are few intelligible books on machine code for the novice.

You were quick off the mark to criticise — how about an educational series in your magazine aimed at the novice, with a view to improving the general performance of all.

Never mind being willing to accept machine code programs teach us how to program in machine code. And I do not mean just publishing a machine code loader go further and teach us how to code a collective program and how to understand the language.

R A Hall
38 Thandford Drive
Beaminster AC6 4NB

The best book that I have seen on the subject of machine code is Toni Baker's *Mastering Machine Code On Your ZX81*. It costs £7.50 and is published by Interface 44-46 Earls Court Road London W8 6EJ.

We do intend to run a series on machine code programming at some point, but the exact timescale is still uncertain.

Target Practice—making it work

PLEASE find enclosed a corrected copy of *Target Practice* published in *PCW* June 10.

After typing the original program into our BBC Micro we discovered several mistakes. Is it not possible to check the program before it is printed in your magazine? These errors took some time to correct there being no documentation with the program. We had to check several books before we discovered the correct formula for the Y co-ordinate.

Muzzle velocity is conventionally expressed in hundreds or even thousands of feet per second. The time delay was too long and has been reduced. BBC Basic has a RAD statement to convert degrees to radians. The proc statement should be followed by the variable in lower case with no space after proc.

It is also good practice to indicate the variable used with the NEXT statement. With these corrections the program will run.

Educational Development Unit
Stevenage College
Stevenage Way
Stevenage
Hertfordshire

Games that leave a bad taste . . .

I AM writing to you on two somewhat diverse matters.

Firstly I was pleased to note from your editorial of May 27 your concern with the bloodthirsty nature of many computer games. While inane games which deal with space or fantasy warfare appear to offend no one those which mimic real-life wars grow more a day truth in one's mouth.

However after being refreshed by the said editorial I was surprised and saddened to see an advertisement on page 8 of your June 3 issue which invited Vic20 owners to bomb Buenos Aires. Not only is this using a subject — the Falklands conflict — which I think should be avoided by games designers, but furthermore the objective of flattening the Argentine capital is sickening.

I find this kind of game quite unacceptable. Must you really take advertisements from this company? I am sure that if you read a straight letters page you would be inundated with other letters expressing similar views to mine.

I would like to hear your defence of your decision to accept this advertisement. I hope that the advertisement does not appear in future issues of your otherwise excellent magazine.

The second point I allude to is much more trivial. I wondered if you have a back-copy service? I have all your issues to date except for April 29 and would very much like to complete my collection.

Ian Winfield
The Flat, The Grange
Little Melton
Norwich
Norfolk

We apologise unreservedly to our readers. The advertisement will not be repeated.

In answer to your second point, back issues are available for 50p a copy (to cover post and packing). Send a cheque or postal order to Back Issues, Popular Computing Weekly Hobhouse Court, 19 Whitcomb Street, London WC2.

Stringalonga maximum errors

STRINGALONGA maximum trickery — I like it. However, I have identified some errors which will thoroughly confuse your readers.

In the first routine in the second column of my Sounds and Vision article (June 24) line 30 should read:

```
30 LET A$=A$+CHR$ PEEK
```

The second routine in that column should read:

```
50 FOR I=I TO I+694 STEP 30
```

Finally the first routine in the third column should read:

```
40 LET I=PEEK 16396+256*PEEK 16397+694
```

Nick Godwin
4 Hunter Crescent
Dymouth
Berwick TD14 5AP

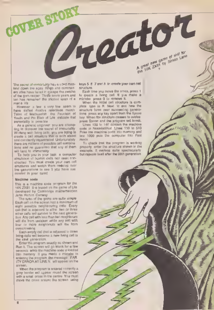
Eliminating those flashing blobs

IN AN article by Andrew Esmond on plotting cubes on the ZX81 (June 17) he asks why cubes jump about on the 1K ZX81 while it is plotting.

The answer is connected with the fact that the 1K screen is only as big as it needs to be. If you print or plot anything to the right of something previously printed on that line the Rom has to juggle around to extend that line. This restructuring of the display file causes the flashing blobs.

You can use empty print statements to fill the area before you start printing and thus prevent the blobs from occurring. Unfortunately you soon run out of memory.

A E Nolan
167 Dyneson Road
Wath-on-Dearne
Rotherham
(South Yorkshire)



COVER STORY

Creator

A great new game of skill for the 16K ZX81 by Simon Lane

The secret of immortality has eluded mankind down the ages. Kings and commoners alike have failed to escape the swathe of the grim reaper. Three score years and ten has remained the allotted span of a man's life.

However, a few a very few, seem to have defied Nature's relentless march. Tales of Methuselah, the Fountain of Youth and the Elixir of Life indicate that immortality is possible.

As a genetic engineer you are attempting to discover the secret of immortality. Working with living cells, you are trying to create a cell structure that is both stable and constantly rejuvenated. Unfortunately there are millions of possible cell combinations and no guarantee that any of them will lead to immortality.

To help you in your task, a computer simulation of human cells has been constructed. You must create your own cell structures and watch them develop over the generations to see if you have succeeded in your quest.

Machine code

This is a machine code program for the 16K ZX81. It is based on the game of Life developed by Cambridge mathematician John Horton Conway.

The rules of the game are quite simple. Each cell on the screen has a maximum of eight possible neighbouring cells. Every cell that is adjacent to either two or three other cells will survive to the next generation. Any cell with less than two neighbours will die from isolation while any cell with four or more neighbours will die from overcrowding.

Each empty cell that is adjacent to three living cells will become a new living cell in the next generation.

Enter the program exactly as shown and Run it. The screen will go blank for a few seconds while the machine code is loaded into memory. If you made a mistake in entering the program the message FAR ITY ERROR AT LINE N will appear on the screen.

When the program is entered correctly a grey border will appear round the screen with a small cross in the centre. You must move the cross around the screen using keys 5, 6, 7 and 8 to create your own cell structure.

Each time you move the cross, press 1 to create a living cell. If you make a mistake press 0 to remove it.

When the initial cell structure is complete type in R. Next, to see how the structure fares over succeeding generations press any key apart from the Space key. When the structure ceases to evolve press Space and the program will break.

Lines 100 to 140 contain the machine code in hexadecimal. Lines 150 to 510 Poke the machine code into memory and line 1000 puts the computer into Fast mode.

To check that the program is working properly enter the structure shown in the example. It evolves quite spectacularly but repeats itself after the 30th generation.



1 REM GAME OF LIFE
LET C=C-INT (C/4096)*4096
IF D<>C THEN GOTO 500
NEXT Z
GOTO 100
PRINT "PARITY ERROR AT LINE
STOP
PAUSE
RAND USR 5
GAME OF LIFE - NEW PATTERN

spectrum



Reviews
software



IK ZX81 chess

Available from David Horne, 126 Southridge Rise, Crowborough, East Sussex. 1K ZX81
Price £3.00

This is one of the more interesting ZX81 tapes to pass through our office in recent weeks. As a ZX81 chess program it is very different.

The main drawbacks of this chess program are that it will not allow you to castle, pawn promote or capture en passant.

The cassette comes in a library case with a fly-sheet made out of a ZX printer listing. The cassette itself has its handwritten name printed in red and the obscure legend "In the beginning".

The tape loads every time without problems in about 30 seconds. There are two versions of the game. In the first, the computer starts by moving its queen pawn forward one square. In the second version, the computer always moves its king pawn forward. The computer always plays white.

The chess board appears as a small grid in the top left hand quarter of the screen. The computer plays from the top and each square on the grid is identified by a letter and a number.

The computer looks ahead one move at a time. On the screen you see each of its pieces going through each of its possible moves. The computer gives each possible position a weighting and then makes its move.

The computer does not allow any illegal moves or cheating and so could prove useful as an introductory game for new players.

It is fascinating to see all the possible moves tried on the screen, instead of having to watch the more usual blank screen.

The greatest strength of this cassette lies in the skills which went into writing a chess game in 1K of machine code. Is there anyone reading this who could even contemplate doing the same?

Summary

Despite the limitations this is one cassette at £3 which I would recommend. It might not teach you a great deal about chess but it certainly lays down a challenge to other programmers. The author is now working on a 2K version. **DS**

Bargain Bytes

Richard Shepherd Software, 22 Green Leys, Maidenhead, Berkshire SL6 7EZ. ZX81 16K cassette.
Price £5.00

Bargain Bytes Cassette Two is a follow up to Richard Shepherd's Bargain Bytes Cassette One. Cassette Two contains eight programs of a games and/or educational nature.

Seafaring Adventure, which takes three minutes to load, is a standard adventure game. Set in the Mediterranean of the 19th century, you find yourself as a Royal Navy Officer in charge of a ship. You start as a Lieutenant in charge of a frigate. You have a crew of 100, food and water for 28 days and 10 tons of ammunition.

Your objective is to sink as many enemy ships as you can while out on patrol. But you must retain sufficient supplies and crew to return to port. This is where the program becomes difficult. You can only return to port when there are no enemy ships in sight. So you may want to return to port after 10 days on patrol, but you may not be able to start your return for another five days.

There are a number of hazards to be faced when trying to reach port. Some of your food may go bad, your ammunition may become unusable and some of your crew may die of disease.

If you succeed in returning to port and have sunk a reasonable number of enemy ships you will be promoted and given command of a larger ship. To win the game you must attain the rank of First Sea Lord.

Other games on the cassette include *Noughts And Crosses*, *Jackpot Fruit Machine*, *Ski Run* and *Stock Market*. The *Stock Market* game will appeal to all budding entrepreneurs. You start with £10,000 and the option of buying shares in a number of different companies. The shares change in value according to the state of the market and current events affecting trade.

However *Stock Market* begins to pall after a while unless you are fascinated by shares and the stock market. It also takes rather too long to set up new market conditions, which leaves you facing a blank screen until the ZX81 is ready for the next round of wheeling and dealing.

The best of the other programs on the cassette is undoubtedly *General Knowledge Quiz*. There are three levels of difficulty and a range of questions in each level. You are given three possible answers to each question and asked to decide which one is correct. The only real criticism I would make of this program is that it sometimes includes the same question twice in one round.

A novel feature of this cassette is a short test program at the beginning of side one. Before attempting to load any of the other programs, you can use the test program to check that the volume and tone levels of your tape recorder are set correctly. Simply load "test" and wait 25 seconds. If "Program OK" appears on the screen you can load the other programs with confidence. If "Program OK" does not appear on the screen, adjust the volume and tone levels and try again.

Summary

A cassette of interesting, well documented programs that is competitively priced at £5. **BG**

Breakout

Bug-Byte, Microcomputer Software, 98-100 The Albany, Old Hall Street, Liverpool. Vic20
Price £7.00

There must be a rule that says a rewritten version of a good old program is always easier than a new program. Software writers have taken it to heart and followed it unswervingly.

A game like *Breakout* is fine when new. After a horde of imitators have covered the same ground the game begins to look less exciting.

Another Vic in the Wall is *Breakout* for the Vic20. There is nothing wrong with the program — what it does it does very well — but it is hardly innovative.

There is a bat, three balls and a blue wall. When the ball hits the wall a brick is knocked out. When each of the balls has failed to hit the bat you are knocked out.

Movement of the bat is precise. It is small and its corners are curved, giving the ball the illusion of being sliced when hit using the outside portions of the bat. For some reason the speed of the ball varies more or less at random from one hit to the next.

When you have broken through the first blue wall there is a yellow wall following it down the screen.

What happens when you break through the second wall is unfortunately still shrouded in mystery for this reviewer.

Summary

A difficult version of this standard game. It is however far too easy to produce new versions of the programs.

It is often more interesting to see what programmers can achieve when they do not have their balls in the wall. There is definitely a need for new ideas. **DK**



The pcb that goes 'bleep' from Fulcrum Products.

ZX Bleep

Fulcrum Products, Hillside Street Lane Findon Worthing, West Sussex.
(Tel 090-671 2750)
Price £8.95 inc VAT and postage.

A response from the keyboard of a ZX81 when a key has been pressed is the ambition of most ZX81 users who have not split out for an additional keyboard.

This little printed circuit board will give a loud bleep everytime a key is pressed and requires no soldering to fit it on to the ZX81. It also fits underneath the keyboard of the ZX81 inside the case so that no unsightly wires are showing and the edge connector is not blocked for the ram pack, printer etc.

The unit comes complete with a gold sticker for the top of the ZX81 saying "My ZX81 Bleeps (does yours?)"

The instructions contain diagrams on how to open the ZX81 (including the hidden screws) and how to fit the bleeper.

The keyboard five-way strip from the Sinclair keyboard must be carefully removed from the socket on the ZX81 printed-circuit board and then placed in the same type of socket on the bleeper. A five-way plastic and copper strip provided with the bleeper is then plugged into another socket on the bleeper and into the now empty socket on the ZX81. Care must be taken in fitting the Sinclair keyboard strip into its new socket as, once broken, the whole keyboard must be replaced.

Now comes the ingenious bit. The printed-circuit board requires power to work and this would normally require soldering to the printed-circuit board. However Fulcrum have provided two little clips which fit into the holes on the printed circuit board to make the connection. These clips could be very useful to constructors, so apply to Fulcrum if you want to get some.

Summary
The bleep will work when any key is pressed, not only when an input is required. It provides a good response from the keyboard everytime and is fairly easy to fit. **SA**

Computer Handbook

The Home Computer Handbook
By Frank Herbert and Max Barnard. Victor Gollancz. 287 pages, hardbook.
Price £7.95

Now being imported from the US, this bulky book looks very tempting at first glance, even at £8. But first impressions can be misleading. The original American title *Without Me You're Nothing* seems to sum up this over long publication.

Instead of providing clear and concise information, much of the book is taken up with a lengthy diatribe against the perils of computers in society. The authors often get so worked-up about people's fear of micros that the work loses its direction.

The main thread of the book appears to be that computers have been kept in the hands of a minority for reasons too dark to disclose.

"You have been led to regard computers as part of a conspiracy ... to make them in the hands of an elite few" is just a sample of what to expect.

Fear not, however, help is at hand. The authors advise "You hold in your hands a book that can change your life" and they continue "We are here to help rid the world of an elitist mystique that has acted as a barrier to your understanding." It is reassuring to know that someone is looking after our interests, isn't it?

The whole book is more of the same. It is a mish mash of jargon and rhetoric, not a beginner's guide to home computing.

Although the chapter headings are fairly sensible — a buyer's guide, programming, organisation — the rest of the chapter is wordy. There is not much of use to a computer novice. There is a glossary of terms but no index. A few TRS-80 listings are also included.

Summary
The title is somewhat misleading. Take no heed of the cover and look carefully at the contents within. You might find it of interest. But it is not of much use, however, to the new micro owner seeking a home computer handbook. **KJ**

Incremental RAM boards

East London Robotics, Finlandia House, 14 Darwell Close, East Ham, London E6 4BT (Tel 01-471 3308)
Price £10.50 for 8K and £11.60 for 16K boards plus £4.95 per 2K ram chip required. 45p post required for orders under £16.

Incremental Ram boards offer an excellent way of buying just as much memory as you need for your ZX81.

The board comes socketed for four or eight 2K Ram chips (6116s) and both boards fit inside the ZX81. The method of fitting the boards requires absolutely no soldering as the connections are made to the ZX81 by plugging the Z80A board processor into a socket on the Ram board and plugging the board into the empty socket on the ZX81. The other connections required are by screws which secure the Ram board to the printed-circuit board of the ZX81 using the holes already present.

The instructions on fitting the Ram board cover benefit every eventuality and are very easy to follow. The only problem comes when trying to find the holes the screws should go in as there is no diagram to help, only one of the Ram board itself.

Although it may seem an expensive way to buy Ram, all the memory is static and does not require refreshing like dynamic Ram packs.

The other advantage is that it can be altered to suit other Ram packs via a set of wire plugs and diodes on the board to be in any part of the 64K memory map of the ZX81. It can even be disconnected from the memory map without removing the board.

It is a simple system to set up and the Ram can be added to at any time with further 2K Ram chips. This makes it valuable for anyone who cannot afford to buy much Ram at one go, but wishes to build up memory little by little as funds become available.

The Ram can be mirrored to provide machine code space anywhere from 8K to 48K (something other Rams cannot do) and could even be paged if required.

Summary
Well worth the money as it eliminates Ram wobble and refreshing problems. It is easy to fit and it can be moved to any position in the memory map. **SA**

Chain reaction in the booming micro market

***David Kelly** looks at the way micros are being sold in the high street stores.*

Microcomputers are emerging at last from the dominance of the faceless distribution and mail-order companies. It is now possible to buy most microcomputers over the counter in high street stores.

Dixons have just spent £150,000 on promotion for the Vic20, which is being sold in 260 of its stores. Their advertisements give a telephone number to ring for the nearest stockist, but the girl on the other end of the line knew little about the Vic20. "Try our Oxford Street store — I imagine they would stock it — they stock everything else."

The Dixon's shop assistant who eventually offered to demonstrate the Vic20 was a bit out of his depth. He explained that it had sound, colour and an ample memory, but he had no software to show. He failed to Run a one-line program to print the word 'hello'.

It is not for a minute intended to suggest that this is a problem peculiar to Dixons. It affects all over-the-counter microcomputer outlets. Selling a micro is not easy.

Terry Steel, spokesman for Boots, said succinctly: "Selling a micro is not like selling a new piece of garden furniture."

Boots also sells the Vic20. This is a comparatively new venture for the company. The idea was first considered six months ago when Boots undertook a reassessment of the sales department range.

"We feel it is a fast expanding market and we are well placed to exploit it," explained Terry Steel. "We chose to specialise in one or two areas rather than cover the whole field."

By only stocking the Vic20 and the TI 99/4A Boots hope to do the machines justice.

The micros are only on sale in Boots top 70 branches at the moment. At least one staff member in each branch has been specially trained by Boots to sell the micros.

W H Smiths were one of the first major chain stores to begin selling micros.

In September 1980 they conducted a regional survey of computer magazine sales. After analysing the results W H Smiths began to place computer stocks and magazines together, sometimes with a PET running demonstration programs nearby.

Now 20 months later W H Smiths is well established in micro retailing, having arranged with Sinclair Research to sell the ZX81 machine. They began selling the ZX81 in September 1981. Initially the ZX81 was sold through 120 stores, but now it is available in any store sited in a population centre of over 60,000.

John Roland, market development manager for W H Smiths, explained: "When you are starting out in a new product field it is important to start with something nice and simple. The ZX81 has some super features for beginners."

Commenting on the success of the line, he said: "The ZX81's return per foot store area means that it more than earns its keep on the shelves."

W H Smiths obviously see a long-term future for selling computers in its stores. So far more than 400 staff have been sent on a full-time residential micro training course.

W H Smiths have pioneered the idea of a computer boutique selling a whole range of computer related products. They offer magazines, books, the ZX81 and its add-ons, plus a wide selection of ZX81 software. Says John Roland: "Our philosophy has always been — if you are going to have a machine you must support it totally."

Ordering a microcomputer through a mail-order company is often an unsatisfactory experience since you have to buy the goods unseen. Buying through a shop therefore has to be an improvement. There at least one can touch the keyboard and prod the casing.

Putting the micro through its paces for a potential purchaser is much more difficult. It is not like a garden chair. You cannot just size it up and understand completely. For many first-time buyers, microcomputers are a mystery which needs to be explained.

It is important that the retail shops should offer an informed, integrated approach to micro selling. Those stores which succeed will at present be those who offer what a mail-order company does not.

They will be able to de-mystify the micro and provide a continuing source of help and advice coupled with a selection of back-up software and add-ons.

What's happening

Mid Cheshire Computer Club throws down the gauntlet! Dave Clare reckons his club can beat any other in the Computer Challenge Match he plans for Friday August 13. Anyone is eligible to join the competition who is willing to try to beat the home team. Dave also wants to hear from clubs in the northwest who could field a team as part of a possible North West League. Contact Dave Clare, 222 Townfields Road, Winsford, Cheshire (Tel: 06065 51374).

Bognor Computer Club (BUG) meets at 7.30 pm on the last Thursday of each month in the RAFA Club. Entry is 50p per session. Contact Neil Vass, Greys Cottage, 36 Aldwick Avenue, Bognor Regis (Tel: 0243 8654510).

Gwent Amateur Computer Club meets on most Thursday evenings at 7.30 pm in St. Mary's Institute, Stow Hill, Newport. Contact Ian Hazel, 50 Ringwood Hill, Newport, Gwent.

Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in. We cannot test all of them.
Contributions should be sent to Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.

(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.

The program will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper avoiding any creasing.

Please enclose a stamped self-addressed envelope.

Spy Hunt

on ZX80

In the game a spy is hidden behind one of 78 bushes — using logic and geometric insight, or just plain guesswork, you have to locate the spy.

You are at the bush that is flashing and you can either press asterisk or move to another bush by using U, D, R or L. When you press * a number appears telling you approximately how far away the spy is from you.

In fact the number shown is INT (distance between you and spy), so that the spy is between D and D+1 away from you, where D is the number showing. Try and find the spy in as few guesses as you can. If you're clever or lucky you should be able to do it in about three guesses.

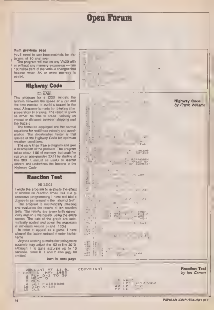
The display is arranged so that no two bushes are more than nine units apart — you could create a larger display but then

turn to next page

PROGRAM OF THE WEEK

```
Spy Hunt
(c) [illegible]
[illegible]
```

Continues next page



from previous page

you'd need to see hexadecimals for decimals of 10 and over.

The program will run on any Vic20 with or without any memory expansion — line 100 takes care of the various changes that happen when 8K or more memory is added.

Highway Code

on ZX81

This program for a ZX81 models the relation between the speed of a car and the time needed to avoid a hazard in the road. Allowance is made for thinking time preparatory to braking. The result is given as either no time to brake, velocity on impact or distance between stopping and the hazard.

The formulae employed are the normal equations for rectilinear velocity and acceleration. The deceleration factor is that quoted in the Highway Code for optimum weather conditions.

The early lines draw a diagram and give a description of the problem. The program takes about 1.5K of memory but could be run on an unexpanded ZX81 by starting at line 300. It would be useful to learner drivers and underlines the lessons in the Highway Code.

Highway Code
by Frank Williams

Reaction Test

on ZX81

I wrote the program to evaluate the effect of alcohol on reaction times, but due to excessive programming I have not had a chance to get around to the 'alcohol test'.

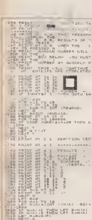
The program is aesthetically pleasing and evaluates the results of ten reaction tests. The results are given both numerically and on a histogram, using the entire screen. The axis of the graph are automatically scaled and cover the maximum and minimum results (+ and - 10%).

In order to appeal as a game, I have allowed the fastest entrant to enter his/her name.

Anyone wishing to make the timing more accurate may adjust the .02 in line 3010, although it is quite accurate up to 10 seconds. Lines 0, 1 and 2 also may be omitted.

turn to next page

Reaction Test
by Ian Carson



```
[illegible] PRINT [illegible]
[illegible] PRINT [illegible]
   PRINT [illegible] THIS PROGRAM
WILL [illegible] THE
   RESULTS OF [illegible]
REACTION TESTS
   PRINT AT [illegible] WHEN THE [illegible]
KEY IS PRESSED A
   PRINT RANDOM NUMBER WILL [illegible]
EAR IN THE
   PRINT BOX BELOW YOU MUST
[illegible] THE
   PRINT NUMBER AS QUICKLY A
[illegible]
   PRINT THIS WILL CONTINUE
   [illegible] TESTS ARE COMPLETED
   PRINT AT 16 15
   PRINT AT 17 1[illegible]
   PRINT AT 18 1[illegible]
   PRINT AT 19 1[illegible]
   PRINT AT 18 15
   PRINT AT 18 [illegible] NUMBER
   IF INKEY$=[illegible] THEN GOTO 1[illegible]
   [illegible]
   [illegible] TO 10
   [illegible] INT AT 18 18
   [illegible] TO INT (50*RND)
   NEXT G
   LET A=INT (RND*10)
   PRINT AT 18 15 A
   FOR T=0 TO 100000
   IF CODE INKEY$=A+28 THEN G
1100
   NEXT T
   LET N[illegible]=T
   NEXT [illegible]
   CLS
   PRINT AT 1 1 REACTION TEST
   PRINT AT 2 1 ------------
   PRINT AT 4 1 RESULTS -
   PRINT AT 5 1 ---
   PRINT AT 7,0, FASTEST -
   PRINT AT 9,0 SLOWEST
   PRINT AT 12,0 AVERAGE -
   PRINT AT 21 22 .TESTS.
   PRINT AT 5,19, T
   PRINT AT 6 19 I
   PRINT AT 7 19 M
   PRINT AT 8 19 E
   PRINT AT 10 19 S
   PRINT AT 16 19 E
   PRINT AT 15 19 C
   PRINT AT 17 19 S
   FOR O=2 TO 20
   PRINT AT O 21 -
   NEXT O
   LET A=0
   FOR K=1 TO 10
   LET N(K)=(INT ((N(K) -82)+
1)/1000
   IF N(K)<F THEN LET F=N(K)
   IF N(K)>S THEN LET S=N(K)
   LET A=A+N(K)
   NEXT K
   LET A=(INT ((A*100)+.5))/10
0
   PRINT AT 7 11 F
   PRINT AT 9 11 S
   PRINT AT 12 11 A
   LET B=(INT ((F+.9)*10))/10
   LET C=(INT ((S*1-1)*10))/10
   PRINT AT 20,17 B
   PRINT AT 8 17 C
   PRINT AT 11 17 (B+C)/2
   LET D=(C B) 38
   FOR Q=1 TO 10
   LET E=(N(Q) B)/D
   FOR Z=2 TO E+1
   PLOT [illegible]
   NEXT Z
   NEXT Q
   IF A<F THEN GOSUB [illegible]
   IF A<F THEN LET F [illegible]
   PRINT AT 16 0 "FASTEST [illegible]
   PRINT AT 1[illegible]
   PRINT AT 20 1 [illegible]
   IF INKEY$ [illegible] THEN [illegible]
   GOTO [illegible]
   LET R=0
   LET B$= [illegible] YOU HAVE THE [illegible]
   LET C$= FASTEST [illegible]
   LET D$= ENTER YOUR NAME
   LET E$=
   PRINT AT 18 0 E$
   PRINT AT 20 0 E$
   FOR O=0 TO 50
   NEXT O
   LET R=R+1
   PRINT AT 18 [illegible]
   PRINT AT 16 [illegible]
   PRINT AT 20 [illegible]
   FOR O=0 TO [illegible]
   NEXT O
   IF R 3 THEN [illegible]
   INPUT A$
   IF LEN A$ 10 THEN [illegible]
   FOR J=16 TO [illegible]
   PRINT AT 0 [illegible]
   NEXT C
   RETURN
   STOP
   SAVE [illegible]
   RUN
```

```
REACTION TEST [illegible]
------------------------------

[illegible]IS PROGRAMME WILL [illegible] THE
[illegible]ESULTS OF TEN REACTION TESTS

[illegible]HEN THE [illegible] IS PRESSED [illegible]
RANDOM NUMBER WILL APPEAR I[illegible]
BOX BELOW YOU MUST [illegible]
NUMBER AS QUICKLY AS POSSIBLE
[illegible]IS WILL CONTINUE [illegible]TIL THE TE
TESTS ARE COMPLETED

      NUMBER

REACTION TEST

RESULTS

FASTEST  - 0.[illegible]
SLOWEST  - 0.9

AVERAGE  - 0.61

FASTEST AVERAGE
      0.76
BY  IAN CARSON
```

Vic

on Vic 20

This is a multiplication used with a difference. A face appears on the screen and shows the x 2 table line by line for a child to recite. The program proceeds through all the times tables up to x 12.

After each table questions appear for a child to answer. When the answer is correct Vic moves on to the next question. If the answer is wrong the same question stays on the screen until it is answered correctly.

Vic's nose glows red when a question is answered wrongly. The number of correct answers is shown at the end of the program.

This is an ideal teaching program for children to learn and remember those boring old tables. It is a program which meets a child's interest as I have proved with my own son.

Lap Counter

on ZX81

One of my hobbies, other than computing, is model car racing. One of my fellow racers suggested that a ZX81 could be used as a lap counter as it is inexpensive and portable.

It sounded easy enough, so I set to work and came up with the following program. The program does all that is needed but it has one slight problem: it is nowhere near fast enough.

In order for a lap to be added the corresponding key has to be held down until the basic program reaches the line concerned which can take quite a while. Also the time taken for a loop (lines 30 to 150) varies depending on whether or not a key is being pressed, so it is impossible to include accurate race timing in the program.

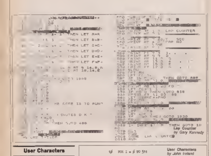
From my limited knowledge of programming the answer seems to be to use machine code. I have tried to write an equivalent program in machine code but failed dismally. If anyone can help I would be very grateful.

My present Lap Counter program works as follows.

Lines 30 to 150: Main loop incrementing score of car 1 to 6 (A to F)
Lines 160 and 167: Time check, time is input (in minutes) at start, slows lines decrement T and starts that time is not zero
Lines 300 to 370: Set variables
Lines 400 to 500: Establish picture
Lines 800 to 900: Give a 10 second (approximately) countdown to start of race.
Lines 1000 to 1060: End of race, and reset.
Lines 2000 and 2010: SAVE" then when program as the program starts automatically on loading.

Vic
by David Paunter

Open Forum



Lap Counter
by Gary Kennedy

User Characters

on Vic 20

There has been a great deal of information published regarding user defined characters for this computer but as yet I haven't seen any mention of how this can be achieved with an expanded Vic.

The problem is that the new character generator can only be located in certain areas of the Ram memory and any program of more than a few K in length would overwrite the new characters.

My program overcomes this by locating the character generator low in memory — starting at location 5120 and relocating the start of basic to 9216. This leaves, with the 16K expansion, just under 15K of user Ram. The unused portion of memory from 4096 and 5119 could be used for machine code routines.

The program transfers the first 64 characters from the Rom character generator to the new one as these will most likely be needed and leaves 3.5K from 5632 to 9215 free for user defined characters.

On running the program you will be left with an odd cursor character as the location of this now contains garbage. To

to next page

User Characters
by John Ireland

```
1Ø  FOR I = Ø TO 511
2Ø  POKE 512Ø + I, PEEK (3276Ø + I)
3Ø  NEXT
4Ø  POKE 36869, PEEK (36869) OR 13
5Ø  POKE 9216, Ø : POKE 9217, Ø :
    POKE 9218, Ø
6Ø  POKE 45, 3 : POKE 46, 36
7Ø  POKE 47, 3 : POKE 48, 36
8Ø  POKE 49, 3 : POKE 5Ø, 36
9Ø  POKE 43, 1 : POKE 44, 36
```

from previous page

restore the usual character type FOR I = 6400 to 6407 POKE I 256 NEXT and ENTER

Care should be taken when entering your own characters not to overwrite these locations. Should it be necessary to press STOP at any time the computer will revert to reading the Rom characters. To restore your own characters simply POKE 36869 PEEK (36869) or 13

Hangman

on Vic

This a normal hangman program. After starting the program the asterisk on the screen denote each letter in the word. The player types a letter into the computer. If it is correct the letter appears in the correct position in the word.

If it is wrong part of the scaffold is built and the wrong letter appears below the asterisks.

The words are kept in data statements between lines 1000 and 5000. The number of words put in data statements must be counted and entered on line 60 (NW).

Reverses

on Vic

This program reverses any non-reversed characters on the screen and unreverses any already reversed characters. It fits easily into an unexpanded Vic20.

Line 10 sets the screen for an unexpanded Vic. The first position on the screen is 7680.

Line 20 tests for additional memory by Peeking into 4096. On an unexpanded Vic this always contains 0. If the Vic is expanded the screen starts at 4096 and the variable A is set to 4096.

Line 30 starts the loop.

Line 40 tests for a reversed character and unreverses it if it is. Then it goes to the next character.

Line 50 reverses any unreversed characters.

Line 60 completes the loop.

```
5  REVERSE PROGRAM BY R W
10 A=7680
20 IF PEEK(4096)<>0 THEN A=4096
30 FOR I=A TO A+506
40 IF PEEK(I)>127 THEN POKE I,
   PEEK(I)-128:GOTO 60
50 POKE I,PEEK(I)+128
60 NEXT I
```

Anagram Birds

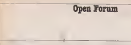
on Vic

This program is designed to help children spell. The Anagram Bird lays eggs which explode into a jumble of letters. Twenty seconds are given to work out what the word is.

After each word has been guessed the screen clears to show the correct answer and shows how many guesses are correct and incorrect.

Words are stored between lines 1000 and 2000. Line 480 indicates the number of words and has to be altered accordingly.

Hangman
by David Pounter



Anagram Birds
by David Pounter

Win the great new ZX Spectrum

All you have to do to enter this award scheme is send us a program in one of the following categories (a) Games (b) Educational/Scientific; (c) Business/Office (d) Utility

Programs for each category should be accompanied by a cassette a copy of the listing and full documentation. Points will be awarded for use of extended code, innovation, structure and ease of use.

The overall winner will receive a ZX Spectrum and Printer. Individual category winners will be awarded £30 of software, and 24 runners-up will receive programming send awards.

A competition coupon will be published in each issue of *Popular Computing Weekly* for the next two weeks. To enter the competition you must send in your program together with any four differently numbered coupons to

Popular Computing Weekly
Programming Award Scheme,
Hobhouse Court
19 Whitcomb Street,
London WC2.

Rules

1. *There is no limit on the number of entries you can send in, but each entry must be accompanied by four differently numbered competition coupons.*
2. *Closing date for entries is August 16, 1982.*
3. *The names of the winners will be announced in the September 16 issue of Popular Computing Weekly*
4. *The Judges' decision is final.*
5. *No employees of Sunshine Publications Ltd. or their families, will be eligible to enter the competition.*

Popular Computing Weekly Programming Award Scheme

Fill in this coupon. When you have collected four differently numbered coupons, send them with your program to *Popular Computing Weekly* Programming Award Scheme, Hobhouse Court, 19 Whitcomb Street London WC2.

NAME ____
ADDRESS ____
____
____
____
PROGRAM CATEGORY ____

3

Programming

Basic rewards to be found in Ramtop

Nick Godwin explains how you can transfer data from one program to another

When you first buy a 16K Ram pack for the ZX81 its potential seems enormous. Indeed, compared with the initial 1K machine it is considerable. Nevertheless it has limits which can show themselves surprisingly quickly if you stick to Basic.

One way of expanding the effective capacity of the ZX81's Ram is to learn machine code. For many people, however, this task is simply too daunting. Having grappled with Basic, the prospect of repeating the process with an unfamiliar and more complicated computer language may be off-putting.

Another method of expanding the effectiveness of the Ram is to physically expand it by means of the various jumbo expansion boards which can now be purchased. However, this is not always financially feasible.

Ram Barrier

There is a third way of breaking the Ram barrier, which is to make use of Ramtop. Most of what is published about Ramtop seems to imply that its main application is in connection with machine code. If you are one of the many ZX81 users who has decided to stick to Basic, you may have dismissed it as being of no use for your purposes. However, Ramtop can be extremely useful in Basic programming.

Ramtop can be used to transfer data from one program to another. First it is necessary to set Ramtop at some convenient address. Ramtop can be set at any address between 16508 and 32768. It represents the top of the area of Ram that can be used for Basic programming.

Whatever exists above Ramtop is unaffected by Save, Load, Clear and New. The only way it can be changed, apart from switching the power off, is by using Poke. The following program enables the address of Ramtop to be set as required.

```
10 SAVE "RAMTOP"
20 PRINT "RAMTOP=";PEEK 16388+256*PEEK 16389
30 INPUT R
40 IF R=0 THEN 9999
50 LET X=INT (R/256)
60 LET R=R-256*X
70 POKE 16388,R
80 POKE 16389,X
90 GOTO 20
```

To save this program, first set your tape-recorder to record and switch it on, then Run. Do not Run the program before Saving it, as it erases itself after completing the operation.

To use the program, first Load "Ramtop". The present address of Ramtop (probably 32768) is displayed at the top of the screen. Enter the address required, and check the display. If the display is incorrect, enter the correct number. If the display is correct, enter zero. The program will promptly disappear. To check that Ramtop has been correctly set, use the following direct command:

```
PRINT PEEK 16388+256*PEEK 16389
```

The display should equal the number and you entered, not zero.

In order to transfer a screen image from one program to another, Ramtop should be set no higher than 32064. Load the program from which you want to transfer the data and add the following subroutine to it:

```
9900 LET R=PEEK 16388+256*PEEK 16389
9910 LET D=1+PEEK 16396+256*PEEK 16397
9920 FOR I=0 TO 792
9930 POKE R+I,PEEK (D+I+INT (I/32))
9940 NEXT I
9950 RETURN
```

You must provide some means of access to that subroutine in your program. This should be situated so that it can be activated when the required display is on the screen. This could be done automatically at some predetermined point in the program by writing the line GOSUB 9900. Alternatively, it could consist of some control facility of a conventional string input:

```
1000 INPUT X$
1010 IF X$="TRANSFER" THEN GOSUB 9900
1020 IF X$="TRANSFER" THEN GOTO 1000
```

If your program normally operates in Slow mode, you may prefer to modify the subroutine so that it operates in Fast. Add the following lines:

```
9905 FAST
9955 SLOW
```

Once you have operated the subroutine, Stop the program. If you want to Save the program, do it now. Next, Load the program to which you want to transfer the image or, if you want to write an entirely new program around the image, press New. In either case the image will be preserved in its location above Ramtop.

The data can now be called down into a string or printed directly onto the screen. If you want to call the data onto the screen, write the following lines:

```
10 LET I=PEEK 16388+256*PEEK 16389
20 FOR I=I TO I+692
30 PRINT CHR$ PEEK I;
40 NEXT I
```

Run the program or, if you have fixed data to preserve, GOTO 10.

To call the data into a string, enter the following lines:

```
10 LET I=PEEK 16388+256*PEEK 16389
20 LET X$=""
30 FOR I=I TO I+792
40 LET X$=X$+CHR$ PEEK I
50 NEXT I
```

Any string can be substituted in place of X$. Again, either Run the routine or use GOTO 10. The effectiveness of the routine can be tested by the command PRINT X$.

To transfer a set of numbers from one program to another, you follow a similar procedure. For demonstration purposes I have assumed that the data you wish to transfer is contained in a variable array X(n), where n is the number of elements in the array. The same principle applies for individual variable names, but it is important to ensure that they are dealt with in the same order on the outgoing and the incoming programs.

First, as before, set Ramtop at some convenient level. The exact level required will depend upon the total number of digits plus the total number of variables. However, so long as you leave plenty of room you should have no trouble.

Load the program from which you wish to transfer the data, then execute the following lines:

```
10 LET R=PEEK 16388+256*PEEK 16389
20 FOR I=1 TO n
30 LET X$=STR$ X(I)
40 FOR R=R TO R+LEN X$-1
50 IF R>32766 THEN STOP
60 POKE R,CODE X$
70 LET X$=X$(2 TO )
80 NEXT R
90 POKE R,128
100 LET R=R+1
110 NEXT I
```

Line 50 is a check that you have set Ramtop low enough. If not, the routine will Stop with report code 9/50. In such a case you should Save the program, reset Ramtop at a lower level, reload the program and GOTO 10.

When this routine has been successfully operated, Load the program to which you want to transfer the data. If you want to write a new program based upon the set of data, operate New. In either case the data remains stored intact above Ramtop. Enter the following routine:

```
10 LET R=PEEK 16388+256*PEEK 16389
20 DIM X(n)
30 FOR I=1 TO n
40 LET X$=""
50 IF PEEK R=128 THEN GOTO 90
60 LET X$=X$+CHR$ PEEK R
70 LET R=R+1
80 GOTO 50
90 LET X(I)=VAL X$
100 LET R=R+1
110 NEXT I
```

Remember that n = the number of elements in your original array. Once you execute this routine, X(n) will contain the original data. This can be tested as follows:

```
10 FOR I=1 TO n
20 PRINT X(I)
30 NEXT I
40 STOP
```

to next page

Spectrum

If more than 22 elements of data are involved, it will be necessary to operate Cont for every 22 lines of display.

To transfer a machine code routine you must again set Ramtop to some convenient level. This should be far enough below 32768 to accommodate one byte for each machine code element.

Load the program from which you want to transfer the machine code. I have assumed that the machine code is next in a Rem statement in line 1, but the program can be adapted by adjusting the initial value of I in line 9010. This initial value must be the address prior to the address at which the machine code starts. The line numbers of the following routine are optional.

```
9000 LET R=PEEK 23730+256*PEEK 23731
9010 LET I=16513
9020 LET I=I+1
9030 IF R=32768 THEN STOP
9040 POKE R,PEEK I
9050 IF PEEK I=118 THEN STOP
9060 LET R=R+1
9070 GOTO 9020
```

Run 9000. If executed correctly, the routine should Stop with report code 9, 9050. If it Stops with report code 9 9030 then you have not allowed enough bytes above Ramtop. In that case, Save the program, reset Ramtop to a lower level and reload the program.

The next step is to Load the program to which you want to transfer the machine code routine. Alternatively, enter New. Assuming that you want to hold the machine code routine in a Rem statement in line 1, you must prepare space to hold it according to normal practice.

```
0001 XXXXXXX    (as many Xs as there are elements in the machine code)
```

Note that the next routine enables you to estimate the number of Xs — inaccuracies will not cause havoc. Enter the following lines:

```
9000 LET I=16513
9010 LET R=PEEK 23730+256*PEEK 23731
9020 LET I=I+1
9030 IF PEEK R=118 THEN STOP
9040 IF PEEK I=118 THEN STOP
9050 POKE I,PEEK R
9060 LET R=R+1
9070 GOTO 9020
```

If executed properly, the program will Stop with report code 9 9030. If it Stops with report code 9 9040 then you have not allowed enough room in line 1. So call line 1 and Edit in more Xs, then GOTO 9000. Any surplus Xs remaining at the end of line 1 after execution of the routine can be Edited out.

The address of the first element of the machine code routine will be 16514, or 1 more than the value of I as set at line 9000.

NEXT WEEK Simulating the upper and lower case functions

Seeing curves where none really exist

***Malcolm Davison** explains how to draw a curve that is not really there*

While the Spectrum's Circle instruction neatly draws an outline circle, drawing a solid circle of colour is not so straightforward. However, this program does the job.

Attractive designs may be created by introducing new co-ordinates, new circle radii and changing the Ink colours. To make this easier you should add line 210 GOTO 4 and introduce an input for the Ink colour.

Fig 1

Fig 2

Incidentally, it takes approximately 30 seconds to draw a 50 pixel circle, which shows how slow the Spectrum is.

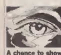
The second program does make use of the Spectrum's Circle facility. It will print an array of circles with a black border and a white ink on a blue background. If you add line 5 CLS the Spectrum will skip on to the correct colours when the program is first Run.

With a bit of practice it should be quite easy to produce the Olympic Games symbol.

The final program is based on an old habit to brighten up school geometry lessons. This program deceives the eye into seeing curves where none actually exist. The lines are black on a cyan background with a black border, but these can be changed to suit your own taste. A CLS command on line 3 would be a useful though not essential addition.

Fig 3

Sound & vision



A chance to show your character

After sitting for hours trying to make up new characters for my Vic20 I decided to write a program to help me define my own characters.

This program can be used to experiment with different characters and shapes. You can use your own imagination to create new spaceships for your space invader program. Alternatively you can design new graphic symbols to illustrate more serious programs.

When Run this program draws an 8×8 grid. To fill in the squares you must press the keys numbered 1-8. Pressing a key for the first time determines the horizontal co-ordinate while the second key pressed press the vertical co-ordinate. Thus pressing keys two and seven will fill in the square two spaces along and seven spaces down on the grid.

After completing the new character press key nine twice and the computer will give you the data for that character. If required the computer will then display the character on the screen.

Lines 6 to 34 of the program print the instructions and the grid. Lines 35 to 100 input the numbers and fill in the squares while lines 200 to 400 calculate the data. Lines 530 to 630 make up the new character.

The program variables are as follows: A$ and B$ which are the get statements; a and b which are the grid co-ordinates; T(1-8) which is the data for the character; CH which determines which squares should be filled in or rubbed out.

Andrew Blackham

You can share your own favourite Sound or Vision programs with other readers by sending lists with explanations to us at *Popular Computing Weekly*

WRITE TO: Sound & Vision, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Character Maker
by Andrew Blackham

```
[illegible]
```

Peek & poke

Peek your problems to our address but Beardsmore will poke back an answer

WHAT'S YOUR GAME COMMODORE, EH?

Graham Allen of Broomage Park Larbert Scotland writes:

Q Could you please tell me how the Vic30 compares to the Vic20? Does it have all the colours the famous Pet graphics the sound? Can Vic20 programs run on it? Is Vic20 pre-packaged software compatible with the Vic30?

A *Commodore have created some confusion here among their new family of computers after the Vic. The Vic10 the Vic30 and the Commodore 64 are a family of computers that are related to the Vic20 but are more geared to the games end of the market.*

From what is known of the Vic30 it will have 16K on board Rom for better sound and graphics. It should be able to support all the Vic20 peripherals including two joysticks and up to four paddles. Ultimax cartridges should run on it but probably not ordinary Vic20 cassettes. The Vic30 will most likely have a mini version of Pet Basic, with no dimensioning of arrays.

It looks to be an excellent games machine that will turn out to be an acceptable computer as well. With a price tag around the £250 mark one cannot help wondering whether or not it is aimed to go into competition with the Atari 400.

NO JOY OUT IN THE STICKS

David Rapport of Cyncoed Rise Cardiff writes:

Q I have purchased a ZX Spectrum. I would like to know if the Micro-Gen joysticks for the ZX81 will work with it?

A *According to Micro-Gen the answer is no. At the moment there is to my knowledge no joystick available for the ZX Spectrum. But it is early days yet.*

Micro-Gen will be bringing out a joystick for the Spectrum in the next few months but they are waiting until there are sufficient Spectrums on the market. It would seem that their caution is well founded judging by the delays we have already seen in the Spectrum delivery dates.

It is most likely that the Spectrum joystick will be similar to the ZX81 joystick in that it will effectively be in two parts – a controller board and the joystick proper.

IS IT WORTH IT, HE ASKS

J J Montgomery of Hampstead London writes:

Q I am a BBC micro model B user and I am looking for a printer. In your magazine recently I saw an advertisement by Microtanic Software which claims that you can link a printer to your 6502 system for less than £80 via their Printerface unit. In their list of computers they include the BBC micro.

Could you investigate their claims. How efficient is the Printerface and can the ZX printer cope with the BBC Hi-res graphics? If not, do you know of any other suitable printer for under £250?

A *Printers like computers are often a matter of personal choice. The ZX printer uses an aluminium coated paper that is four inches wide. The characters are sparked onto the metal film by two quickly revolving electrodes. It will at best only make an adequate job of the Hi-res graphics on your BBC micro.*

If you do have £250 to spend then I would suggest that you have a look at the Seikosha GP-80. This is an 80-column dot matrix printer and just falls within your budget. The printer has been quite widely advertised in the computer press but you might find it best if you write and ask for further details. The address is Micro Peripherals 61 New Market Square Basingstoke Hampshire RG21 1HW.

The GP-80 should make quite a good job of the Hi-res graphics. It is a paper printer that can be interfaced to other computers but it costs some three times as much as the ZX Printerface. When it comes down to it, I can only say that it is your money and your decision.

YOU MUST BOOK UP YOUR IDEAS

Miss V Allen of Stockton Lane York writes:

Q I am interested in computer programming and would appreciate it if you could give me some examples of flow charts and programs.

A This quite simple question could be answered more easily in a book. If as I assume you are new to microcomputing I would suggest that you seriously consider getting a computer. Without a computer books quickly become frustrating or meaningless.

As for computer programs we publish about six pages of them every week. Most books on computers and probably all the magazines have some plus of computer programs.

If you are looking for a book that combines both programs and flow charts you should realise that many books published for the home computer user do not deal with flow charts. This is because many hobbyists who have not had any computer instruction of whom do not use them.

One book that does combine both flow charts and the development of programming skills is Computer Programming in Basic by Peter Bishop. Published by Nelson it is used in some schools as an O level textbook and would make a good general introduction.

IT'S ENOUGH TO MAKE YOU JACK IT IN

Noorul Haque of Dawnside Road Wolverhampton writes:

Q I bought a ZX81 about three months ago. Ever since I have had a problem with the 3.5mm jack plug from the mains adapter. It does not fit exactly into the socket and it wobbles. It is pretty annoying when this happens in the middle of a program and it crashes. I do not want to send it back because it will take a long time. Could you please tell me what to do?

A *This is the sort of Catch 22 that many Sinclair owners find themselves in – dare I or daren't I send my computer back. In this case experience has shown that even if you did it might well come back with no appreciable difference.*

There are two things you can do. Firstly take the case apart. This is quite easy as long as you remember that three of the screws holding the case together are under the rubber feet.

Next unscrew the PCB which will give you access to the sockets. Using a small screwdriver depress the clips on the power input socket. This should give you a better connection but unfortunately it does not always work.

If you get really desperate cut a hole in the case on the slope below the X8 of ZX81. Open up the socket clips and take the power from the jack plug to the clips using small crocodile clips.

Warning: firstly the case is surprisingly thick at this point. It will take time and care to cut through it. Secondly there will be extra wires that might interfere with the LOAD/SAVE leads if you are not careful. Thirdly keep a wedge of insulating tape between the two crocodile clips or you might short out the power supply.

It sounds complicated but as long as you are careful it is quite straightforward. But remember that it does make your guarantee void.

● *Stop agonising over that problem. Write to Ian Beardsmore Peek & Poke Popular Computing Weekly Hobhouse Court 19 Whitcomb Street London WC2 7HF*

Competitions

Easy as falling off a log?

by Gordon Lee

When programming you will probably have found the IF/THEN Basic command to be one of the most useful.

However, this command in some situations has to be used with care. Consider the following example (for the ZX81 but applicable to other machines). Key in as a direct command (** is the power symbol):

IF 3**3=27 THEN PRINT "HOORAY"

Did your computer print 'Hooray'? It did not; let us try to see why not.

Key in

PRINT 3**3

This gives a display of 27, yet the computer has just rejected this in the IF/THEN statement. Now key in

PRINT 3**3-27

Instead of the expected result of zero, you should see displayed 1.4901161 E-8. This should now give us a clue as to what has been happening.

If you are unfamiliar with scientific notation you will probably be puzzled by this strange number with the letter 'E' tucked away among the digits. This is just a way of expressing very small, or very large, numbers without having to use lots of zeros. In this notation the number is separated into two parts — the first part gives the actual numerical value and the second part, called the exponent, indicates its magnitude. For example: 4E5 = 4 × 10^5 = 400000 or 4E-5 = 4 × 10^{-5} = 0.00004.

Let us now return to our original problem of evaluating 3 to the power of 3. Instead of the correct answer of 27, the computer has in fact evaluated the result as 27.000000014901161. Unfortunately, although the spurious decimal value is not displayed, it is still held in the computer's internal memory and will influence any IF/THEN decisions made upon it.

The reason for this is the computer's use of its own logarithmic function in evaluating powers. Since logarithms are numbers which cannot be expressed exactly as decimals their use entails certain inaccuracies.

Mi

Fe

Fa

Seh

Mongo

Puzzle No 13

At the far reaches of the universe in the galactic nexus NN6143 is the distant star alpha Boolion. Around this star orbits the inhabited planet of Mongo.

The planet possesses four perfectly spherical moons, Fe, Mi, Fa, and Seh. It has recently been discovered that the volume of Fe, the largest of the moons, is exactly equal to the sum of the volumes of the three smaller moons — all of which are of different sizes. Latest research indicates that the radii of all four moons can be measured in an exact number of mungs (Mongo-power units of length).

What are the smallest radii possible for the four moons of Mongo (in mungs)?

Rules

The winner of the puzzle will be the reader who, in the opinion of *Popular Computing Weekly* editors, submitted the best solution. Preference will be given to solutions which show how the entrant arrived at the correct answer.

Envelopes containing entries should be marked clearly with PUZZLE.

The closing date for the competition is Tuesday, July 27.

Solution to Puzzle No 9

By making a few trials it can been seen that the maximum value X_{max} occurred lies between 2 and 3. The correct approach is to start at 2 and increment this value by a small amount using a loop. If X is found for each value of n then X_{max} will be found at the turning point when X stops increasing and begins to decrease. (This assumes that there is only one local maximum.)

Using such a routine, X_{max} is found to be equal to 2.7182. This number is a mathematical constant called e. It is used as the base of the natural or Naperian logarithms.

There is however a less longwinded way to solve this problem. Using calculus, take the natural log of both sides and find the differential, dX/dn. At the maximum value, assuming X≠0 and n≠0, dX/dn=0. This solution is more elegant and lines up with the exact answer, e.

Winner of Puzzle No 9

The winner is A G Hall, Amelia Way, Collingham, who receives £10.

Solution to Crossword No 9

Across: 1 Commodore, 8 Rest, 9 Spectrum, 10 Rooms, 11 Maker, 13 Trills, 15 Brassey, 16 Sinclair, 18 Dodo, 19 Tangerine.

Down: 2 Optical, 3 Mosle, 4 Dream, 5 Rat, 6 Forebrain, 7 Supersede, 12 Stand on, 14 Slang, 15 Borer, 17 CIA.

Winner of Crossword No 9

The winner is G. Wood, Lawson House, London W12, who receives £10.

CITIZEN PAIN

BY DAVID IRELAND and JAMES MACDONALD






MICROAGE ELECTRONICS
BBC Microcomputer System A's and B's in stock now!
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LOOK
New



"...the quality of the colour display is excellent". *Popular Computing Weekly*

"The graphics facilities are great fun". *Personal Computer World*

"...the Spectrum is way ahead of its competitors". *Your Computer*

"The world's best personal computer for under £500."

Clive Sinclair

Sinclair ZX Spectrum
16K RAM £125, 48K RAM £175.

This is the astonishing new ZX Spectrum – a powerful professional computer in everything but price!

There are two versions – 16K or a really powerful 48K. Both have a full 8 colours, sound generation, a full-size moving-key keyboard and high-resolution graphics. Plus established Sinclair features such as one touch keyword entry, syntax check and report codes!

Key features of the Sinclair ZX Spectrum

Full colour – 8 colours plus flashing and brightness-intensity control.

Sound – BEEP command with variable pitch and duration.

Massive RAM – 16K or 48K.

Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.

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ASCII character set – with upper- and lower-case characters.

High speed LOAD & SAVE – 16K in 100 seconds via cassette, with VERIFY and MERGE for programs and separate data files.

The ZX Printer – available now

The printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high resolution graphics.

Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

ZX Microdrive – coming soon

Each Microdrive will hold up to 100K bytes on a single interchangeable microfloppy – with a transfer rate of 16K bytes per second. And you'll be able to connect up to 8 ZX Microdrives to your ZX Spectrum – they're available later this year, for around £50.

How to order your ZX Spectrum

BY PHONE – Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day.

BY FREEPOST – use the coupon below. You can pay by cheque, postal order, Access, Barclaycard or Trustcard.

EITHER WAY – please allow up to 28 days for delivery. And there's a 14-day money-back option, of course. We want you to be satisfied beyond doubt – and we have no doubt that you will be.

sinclair ZX Spectrum

Sinclair Research Ltd
Stanhope Road, Camberley, Surrey
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To: Sinclair Research, FREEPOST, Camberley, Surrey GU15 3BR.

Qty	Item	Code	Item price £	Total £
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	Sinclair ZX Spectrum 48K RAM version	10	175.00	
	Sinclair ZX Printer	27	[illegible]	
	Printer paper (pack of 5 rolls)	16	[illegible]	
	Postage and packing: orders under £100	28	[illegible]	
	orders over £100	29	[illegible]	
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